and others have been published in the *Transactions* of British scientific societies. Among the reprinted articles we notice—to name a few—Prof. Dewar's British Association presidential address on the history of cold and the absolute zero; Prof. J. G. McKendrick's contribution to the study of experimental phonetics; Dr. J. J. H. Teall's address on the evolution of petrological ideas; and Mr. H. G. Wells's Royal Institution lecture on the discovery of the future. There are several translations from French and German of important papers also included, such as Prof. A. Dastre's article in the *Revue des deux Mondes* on the life of matter; Dr. Georg Jacob's "Oriental Elements of Culture in the Occident" from the German; and Herr Oscar Israel's appreciation of Virchow from the *Deutsche Rundschau*. Like all similar publications from the Smithsonian Institution, the volume is provided with many excellent illustrations.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN JANUARY, 1904:—

Jan. 3-4. Epoch of the January meteors (Radiant 230° +53°).
5. 10h. 13m. to 11h. 9m. Moon occults *o* Leonis (mag. 3·8).
12. 10h. 11m. Minimum of Algol (*β* Persei).
,, 15h. 0m. Ceres in conjunction with moon. Ceres 0° 58′ N.
15. Venus. Illuminated portion of disc = 0·707.
,, 6h. 58m. Minimum of Algol (*β* Persei).
27. 0h. 0m. Vesta in conjunction with moon. Vesta 0° 21′ N.
28. 4h. 55m. to 8h. 8m. Transit of Jupiter's Sat. III. (Ganymede).
,, 8h. 0m. Venus in conjunction with Uranus. Venus 1° 47′ N.

EPHEMERIS FOR WINNECKE'S COMET.—A second part of the ephemeris for the 1903-4 appearance of Winnecke's comet is published by Herr C. Hillebrand in No. 3916 of the *Astronomische Nachrichten*, from which the following has been taken:—

Ephemeris 12h. (*M.T. Berlin*).

1904	α app. h. m. s.	δ app. ° ′ ″	log. *r*	log. Δ
Jan. 0	17 30 51	−17 46 46	9·988836	0·272241
,, 4	17 50 44	−18 39 19	9·981012	0·270012
,, 8	18 10 59	−19 24 20	9·974601	0·268606
,, 12	18 31 32	−20 1 5	9·969782	0·268027
,, 16	18 52 16	−20 28 58	9·966685	0·268248
,, 20	19 13 4	−20 47 33	9·965417	0·269255
,, 24	19 33 50	−20 56 41	9·966004	0·271006
,, 28	19 54 27	−20 56 24	9·968430	0·273468
Feb. 1	20 14 47	−20 46 57	9·972633	0·276601
,, 5	20 34 46	−20 28 49	9·978474	0·280344
,, 9	20 54 18	−20 2 38	9·985794	0·284645
,, 13	21 13 19	−19 29 13	9·994414	0·289439
,, 17	21 31 45	−18 49 25	0·004129	0·294662
,, 21	21 49 35	−18 4 11	0·014739	0·300253
,, 25	22 6 47	−17 14 26	0·026059	0·306155
,, 29	22 23 20	−16 21 3	0·037913	0·312312

SPECTRUM OF MIRA CETI.—In No. 5, vol. xviii., of the *Astrophysical Journal*, Mr. Joel Stebbins, of the Lick Observatory, gives the results of a study of the spectrum of *o* Ceti made with the 36-inch refractor during the period June, 1902, to January, 1903, in which period the magnitude of the star decreased from 3·8 to 9·0. The spectra were obtained with spectrograph i.—which is the Mills spectrograph converted into a one-prism instrument—attached to the 36-inch, and a spark between iron poles was always used as the light source of the comparison spectrum.

The absorption spectrum obtained is not very like the solar spectrum, but the calcium lines *g*, H and K are all present, *g* being comparatively much more intense than in the solar spectrum; the iron lines are not prominent, and even the strongest do not appear when a small dispersion is employed. The *g* line undoubtedly becomes broader as the star grows fainter, for on June 27 (mag. = 3·8) its width was 2 t.m., whilst on September 6 (mag. = 7·0) it was 9 t.m. The lines at λλ 3990·64, 4045·16, 4093·55 and 4097·08 respectively, which are apparently not coincident with solar lines, appeared at successive intervals during the diminution of magnitude.

A comparison of the several spectra shows that with the decrease in the star's magnitude the continuous spectrum from λ 4300 to λ 5000 becomes relatively fainter than that between λ 4000 and λ 4300.

The bright hydrogen lines are very prominent, and Hβ and Hε, which have been reported as absent by other observers, appear on all the dense negatives, and they appear to grow relatively stronger than the other hydrogen lines, and the continuous spectrum, as the star's magnitude decreases. In addition to the hydrogen lines, bright lines of Si, Mg and Fe are probably present, and numerous changes took place in their relative intensities during the interval covered by the spectrograms. For example, the line at λ 4007 undoubtedly disappeared altogether, whilst the line at λ 4571—possibly due to magnesium—developed in a remarkable manner. The latter did not appear at all until the star's magnitude had fallen to 5·4, and afterwards it became the most prominent feature of the whole spectrum. The evidence obtained supports the conclusion that the bright hydrogen lines disappear at minimum.

Determinations of the star's radial velocity showed that it remains constant at about +66 km., and this is held to be a strong argument against the theory that the light-changes are due to the existence of a companion. The abnormal changes in the relative intensities of the hydrogen lines—which are displaced from their normal positions towards the violet, apparently by other causes than radial velocity and pressure—lead Mr. Stebbins to the conclusion that the light changes are due to internal causes which produce effects that are, as yet, unfamiliar to us.

THE "COMPANION TO THE OBSERVATORY," 1904.—The 1904 edition of the well-known annual compendium of astronomical data, the "Companion to the Observatory," is very similar to that of 1903. It contains, amongst other information, the usual tables for solar, lunar and planetary observations, ephemerides for the various satellites, and minute data regarding a large number of variable stars.

Mr. Denning has contributed a set of notes regarding the principal meteor showers, and Mr. Maw has supplied a list of double-star observations, whilst the numerous variable star ephemerides have been taken from advance proofs supplied by M. Loewy.

OXFORD AND SCIENCE.[1]

WHEN I am tired I sometimes go by train to Reading and cycle over here swiftly in the afternoon, and then I dress and dine comfortably at the *Mitre* and go out for a stroll. Perfect rest is not possible unless there is moonlight, but Oxford is always wonderful and satisfying and restful to an engineer like me. It is not because of its age, of the great men who have studied and worked in its colleges, of its almost unique character and high rank among universities, of the sacred beauty of its colleges and streets. It is because that to me it represents what is most persistent in the constitution of the British Empire. The Houses of Parliament, Westminster Abbey, the Temple and City of London, Windsor, the great mansions of our English nobles, each of these suggests much to any man who is fond of reading, but each suggests only a small part of what Oxford represents.

Now the thing that pervades all my thoughts of Oxford is that more than half of the most distinguished Englishmen during four hundred years have been educated here. And if, as I sometimes do, I include Cambridge when I say Oxford, all the most distinguished Englishmen during four hundred years have been educated here.

Whether we like it or not, it is a fact that England is an aristocratic republic with the King at the head of the

[1] An address delivered by Prof. John Perry, F.R.S., at a public meeting in Oxford, arranged jointly by the Ashmolean Natural History Society of Oxfordshire and the Oxford Mathematical Society.

aristocracy. There is a disadvantage in almost all our rulers being selected from a limited class. But in the democratic republics of America and Europe there is the far greater disadvantage that the nation seldom commands the public services of rich or cultured men or men of family. Here there is no man so high in rank, or so rich or so intellectual, that the nation cannot command his willing services. Again, there never in the history of the world was an aristocracy like ours, admitting new men in every generation, allowing a constant flow of its younger sons downwards. Americans may gibe, and some of the younger of us may rail, but this system of government is beloved of all people in England, rich or poor; it is so much a part of the English constitution that no student of history can imagine an England governed in a different way, and this aristocracy will retain its power over a believing people until the time comes when it ceases to believe in its own self. At any one time it is only a minority of undergraduates who belong to the ruling caste, but the important thing to think of is that practically every member of the ruling class of England passes the four most important years of his life in Oxford (or Cambridge). All the rest of his life he looks at things through Oxford spectacles. His father and his father's friends were Oxford men. His mother and his aunts have always been under the influence of Oxford clergymen; even the lighter literature and journalism of the household are from Oxford pens. Until he leaves his nursery, under his earliest tutors, in his preparatory school, in a public school, every tutor he has had, every influence round him, have been dominated by Oxford feelings.

When at an age of from twenty-one to twenty-four a young man enters Parliament or diplomacy, or any of the reserved parts of our public services, his character is formed; all his ways of thinking and his prejudices are on the models most revered in Oxford. His early youth has been influenced by Oxford of the past, his undergraduate ways have influenced and been influenced by Oxford of the present, and his prejudices, kept strong by loving memories, exercise an influence against all changes in Oxford for the future.

I have often thought that Darius and his companions, the sons of the ruling families of Persia, had a most delightful education. We do not hear much of their love for literature or what we should call school-book work. Their education was in companionship with each other and with their wise fathers and their friends; in military exercises and in sports. Young gentlemen of England have always had that sort of education. It was probably best in Plantagenet times, when, indeed, a well trained young gentleman was not only very healthy and courageous, but he had not much chance of becoming lazy; he had the opportunity, denied to the lower classes, of becoming fit to lead in warfare, fit to assist in all that then constituted the government of his country. But when the positions hitherto monopolised by great ecclesiastics became possible for laymen, if these laymen possessed the necessary learning, youths of the higher class began to go to Oxford, and in the times of Queen Elizabeth and James there was real liberal culture among them such as had never been before and has never been since. To go to the university then became fashionable, and remains fashionable with youths of our higher classes.

What is the nature of the education now given to one of these young men? His father, a man of consequence in his county, perhaps in the legislature, probably experienced in public duties, with much knowledge of men, has played with him in his infancy, and keeps in touch with him always. Even from infancy he has been in contact with the great people of his time. No book work, no lectures were needed in teaching him the manners of his class. He cannot help acquiring the virtues of the aristocrat; his personal honour is dear to him, he always speaks the truth, he scorns all meanness, he respects the rights of others of his own class, and, indeed, of all others in so far as he understands that they have any rights. He shoots well and rides well. For some generations back he has been cleanly in his person, and he has been temperate and keeps healthy of body. Whatever becomes a custom of his class he follows as a law. Loyalty to his class and to the head of it are his creed. On the other side, he is ignorant of all knowledge that has not come to him by actual observation. His sympathies outside his own class are very limited and conventional. His traditions are to the effect that only one man in a hundred takes heartily to school work, to book work, to learning; that the average man of his class does not go to Oxford for learning. He goes to finish his education, to meet and make friends with men who are to share with him later on in the government of the country. Healthy as an otter, unflinching as a fighting cock, faithful and courageous as a bulldog, clean as a cat, in far more intimate companionship with men than he ever will be again, he admires or makes close friendship with or mildly dislikes these equals. His connection with the university is small; his college is everything; tutors were created for him. He learns the value of public opinion; he learns that ginger may be hot in the mouth, and yet he is surrounded by such police arrangements that he is guarded from ruin even when he is most reckless. Truly it is a wonderful experience, a valuable education, and it is never through book work or lectures, but from actual experiment and observation that the average young Englishman ever has or had any kind of education. Darius and his young companions were well fitted to rule, but they probably could neither read nor write. The average young man who leaves Oxford with or without a pass degree forgets very soon what book work, what learning, he ever had, and he dislikes reading. He has always been laconic in speech, and finds a small vocabulary quite large enough for his needs. He has successfully cultivated an appearance of want of vulgar interest in anything, so that want of practice begins to tell upon his powers of observation, and his resourcefulness tends towards that of the ostrich. It is fondly assumed by his tutors that, although he soon forgets his Latin and Greek, yet his study of these was the medium of much mental training; that the study of Euclid and logic have given him a logical mind. I cannot deny that there may have been some mental training through Latin, but I assert—it is, of course, mere assertion—that it has not been much. On the other hand, I assert that much harm has been done, for his hereditary prejudices against all book work, all learning and literature have been deepened. For the few men of his own class who take kindly to literary studies he has a respect not untinged with doubt. Between him and the real student not of his own class there is a great gulf fixed, like what there is between him and clergymen.

Observe that I am not here referring to the education of the real students. For them, it is true in a very limited range of subjects, but for them there is the most wonderful education ever known.[1] They also make friends for life, they take fire at each other's ideals as only young men can, they meet every day the great scholars of their age who are also students, and there is always a fine education in the mere contact with men worthy of young worship. Young men like this need but little teaching; they are fond of books and educate themselves.

It is easy for an outsider to overpraise this education, because the glamour of the beautiful college life is on all his thoughts; he does not at once observe how narrow the culture has always been, and how now the examination system is cramping it more and more. Oxford is hard, unspiritual and idolatrous, and the absence of scientific method is evident everywhere. Oxford is like a technical school, training these better men for the higher posts in the Church, in the Civil Services, in journalism, at the Bar, and in boys' schools. And it is found that these successful men have dwarfed imaginations and no power to think for themselves in any subjects outside their narrow professional grooves. The barrister who seems inspired in the Law Courts is mute and inglorious in the House of Commons. The readers of the hundreds of newspaper

[1] Just nine days ago I gave a short address on the twentieth anniversary of the opening of College Hall, London. It is a hall which Lady Lockyer, her sister and her friends started for women students attending medical and other college courses where they might have that companionship without which there can really be no higher education. It is curious that this should be the only college hall in London, that London should be so well provided with university professors and lecture rooms and laboratories, and that the equally important colleges of residence should be non-existent. A great city like London needs such halls far more than Oxford did when William of Durham and Walter de Merton began to build.

articles of any morning—as like one another as herrings—are awed with their display of culture, of depth of thought, of knowledge, and with what is more astounding than anything else, an infinitely perfect Oxford polish. Watching the performances of an Oxford man of letters is like watching a good billiard player or a skilled musician. His mind is filled with the thoughts of other men, pigeonholed, ready for use. He thinks those thoughts to be his own, and he never takes in the real meaning of the fable of Diogenes and the lantern. He does really think for himself in that part of his trade which is personal to himself, and he has an abundance of all learning except what concerns those natural sciences the applications of which are shaking the social and intellectual world. He is never grossly unfair to other men who follow the rules of the game recognised by Oxford; against men of new ideas his struggle oft availeth. In dealing with some questions he is a genius towering to the heavens, in others he is like that same spirit imprisoned in a little bottle, sealed up magically by the mere name of some wise man of antiquity.

It is very noticeable that the Oxford man has retreated from the renaissance position and has gone back to the mediæval. He believes in his soul that there is no new thing under the sun; truth is not a thing to be discovered, it is something already revealed in Hebrew and Greek books. Even if a man is doing research it is after the poison has entered his system; his individuality has been practically destroyed. But for the present I am neglecting these real students. I am confining my attention to the average men of caste. These men are educated in the sense in which Darius and his friends were educated, excepting in this, that Oxford men do not know living foreign tongues, whereas the other barbarians did, and Oxford men pretend to know something of certain tongues that are dead. Every attempt to teach them by actual observation, actual experiment, actual trial, actual research, has succeeded well; every attempt to teach them by mere talk, by abstract reasoning, has failed.

And the world now to be governed is getting more and more complex. Man is utilising the energies of nature in thousands of ways unknown to the ancients. Common people are all getting educated. Where the ancients wondered and trembled, we understand and give orders to nature. The average unit of any population was compelled to be what we now call an unskilled labourer.

Now our labour is becoming more and more skilled. Are you aware that from one ton of coal there is as much energy, as much actual work, as may be done by forty thousand good labourers in a ten hours' day? Our best steam engines utilise only one-tenth of this energy at the present time. But even now we know that the cost of the most unskilled work done by man is one thousand times the cost of the same work wherever it may be done by the best steam engines. One fact of this kind properly considered is worth many long essays about the effect of the engineer in altering all the character of our civilisation. It is labour that is the true standard of wealth. The steam engine has added incalculably to the wealth of the world. We forget that man is no longer needed for unskilled labour, so that when we use unskilled labour we are using the materials which God has given us in the most inefficient manner possible. Furthermore, it becomes sweated labour, it unduly taxes skilled labour, it starves invention, and it brings up base, ill-fed families.

I do not think that a fact of this kind would have been neglected by the philosophers of Greece or the learned men of Rome, but when some of us direct attention to it and its neglect by modern philosophers, we are sneered at as Philistines; when we say that the nation which does not pay great attention to the practical application of scientific knowledge of nature must cease to exist, we are jeered at. We are low mechanical persons enacting the part of the fat boy in "Pickwick," "I'se goin' to make your flesh creep!" It is a curious kind of culture which scorns the lessons of history, the study of man in his relation to nature, the study of the enormous new forces which are now affecting the relations of nations to one another. Are you learned misers going for ever to gloat in secret over your learning or to edit for ever the same Greek texts, or for ever to spin new metaphysical philosophies out of your inner consciousness?

Are you for ever to labour over phrases and dogmas that have been endlessly discussed by the most acute intellects of all time? If through a practical study of palæontology or biology you could get really to understand the great discovery of Darwin (and you cannot possibly get to understand it from books alone), you would see that the oldest puzzles of children and philosophers, from the shepherds of ancient Idumea to the dons of Oxford, have been solved for ever. Have you for one moment any idea of the magnificent new problems that are now before us, of the wide outlook on the universe, the comprehensive grasp of what is great and what is little, which is possessed by naturalists? For one man who knows his English literature, who revels in Shakespeare, are there not ten in Oxford who scorn all literature which is not at least 1800 years old? If you must meditate about your thoughts and emotions, why not begin with some experimental psychology? Why is there so little research of any kind in any subject going on in Oxford? The study of the Greek language through Herodotus is called *history*. The study of the Greek language through the early fathers is called *theology*. The New Testament is degraded into a Greek text-book. The Iliad and Odyssey are only Greek exercise books. The clear gushing spring of the desert beloved of Erasmus and More is now trampled into dirt by innumerable dromedaries. Is it any wonder that the average healthy young Englishman whose common sense has been developed through observation and trial should leave Oxford ignorant of your sand-ploughing scholastic exercise work? You have thought him stupid, and made him believe himself to be stupid, when he was only showing his wisdom. The mental training that he might have had, that he needs in life, that kind of training which his ancient Persian education cannot give him, where is it? When he was a very young boy you tried to teach him arithmetic for years, a cruel exercise. Now he does not know what a decimal is; when he borrows money at 5 per cent. per month he does not know that he is paying 60 per cent. per annum. If you had let him experiment, play at keeping shop, actually weigh things in ounces and pounds, or pay for them in shillings and pence, if you had let him measure things in inches and tenths of an inch, it would have been a pleasure for him to learn. If he had spoken French and German, and had been encouraged to chatter in those languages, he would not now be so ignorant. If you had encouraged him to read stories, if later you had not made all reading a school task, if you had encouraged him to describe things, to write accounts of what he had seen; if you knew how to teach anybody English, the language of his country, if you had refrained from putting geography and history and other English subjects all in water-tight school class compartments, he would now be fond of reading, he could use books, and he would go on educating himself for the rest of his life. You made him wear his soul out in learning off Euclid by heart—why did it not strike you that he ought to draw and measure, weigh and experiment, long before you tried to give him abstract reasoning of any kind? How is a boy to reason about things unknown to him? In the nursery he got mental training through everything he saw, everything he clutched. Oxford took charge of him scholastically at the age of seven, and from that time onwards his higher mental powers ceased to grow. His mental equipment suggests the item for bread in Falstaff's famous tavern account.

And he becomes a ruler of this great nation, his duty during war and peace being that of a scientific administrator. Times of actual war are few and short; in those times the people and property of unprepared nations are destroyed with a rapidity never known in the past. In all old times England was unprepared for war, but this did not then so much matter; in future the nation that has not prepared during peace for possible war, by the exercise of the highest scientific faculty, will certainly be destroyed.

I am afraid that Von Moltke would have laughed at the kind of education of Darius and his friends being regarded as sufficient in these modern days. Also the war between nations is quite intense in times of peace. The rulers of nations have to take care that their laws do not destroy

industries, that they develop the right sort of education of the people; that the people shall be so educated as to become resourceful, full of initiative and invention, capable of learning from experience, people of character. Again, if our rulers set a fashion of gibing at scientific things, at technical education, for example, through ignorance, it is not unimportant to know that the complete loss of trades like the coal tar industries may be more serious evils than the loss of several campaigns in war used to be. If the Prime Minister, or any other minister, gives an important post to a non-scientific man, it may not be harmful, but sometimes it may be very harmful indeed; it may lead to the appointment of many unscientific men or the disgrace of the scientific men already engaged in some department where science is all important. But the evil is very much more far reaching than one can describe in words. Want of science in the rulers means neglect of scientific education and method throughout the whole country.

For your man of caste is an Oxford man, and as a ruler of his country he regulates all sorts of courses of instruction and examinations for the army, the navy, the Civil Service, the Indian Civil, the Colonial, and all sorts of other services, and he takes care that all these shall be on Oxford lines. The higher permanent officials are chosen by Oxford standards. The members of scientific committees appointed to assist Government departments are chosen by Oxford standards. Do educational experts suggest reforms in education, it is Oxford that determines whether the reform is received sympathetically or otherwise. Probably nowhere is the influence of Oxford felt more than in the primary schools of the country.

I know you are proud that Oxford should have so great an influence, and I do not suppose you will pay any attention when I suggest that it may lead to national misfortune. If Oxford scholars were merely like so many monks in their monastery, living the lives, following the studies which they love, I would say nothing. The revenues so used up are, I think, of no great importance to the country, and busy men elsewhere can only be benefited in knowing that there are these lovely lamaseries where men are living in serene air apart from the struggles of the world, living what they think to be the higher kind of life, that of the amateur copying the lives of the scholars of Constantinople before they were so mercifully scattered in 1453, copying the meditative ways of the divines and hermits of the fourth and fifth centuries.

But the Oxford hermit is also a ruler of an empire in the twentieth century. Edward the Confessor was a saint, but some of us think that he was not a very wise ruler of England. Louis XVI., too, was an amiable man. The downfall of nations has generally come from the too great power of some quite amiable amateur persons or corporations. It is mainly through her too great influence on the ruling families of England that I consider Oxford to be dangerous.

What, then, is it that we want? We affirm that all so good as the development of the faculties of the average Oxford man may be, it might be enormously increased. He learns by observation and experiment; he and his forefathers have never learnt anything otherwise. Why not, then, increase for him these chances of observation and trial? Frankly confess that to develop his reasoning faculties through mere repetition of the text of Simpson's Euclid is an absurdity, that he cannot at all take in abstract reasoning; that the academic methods of teaching mathematics and its applications are what we all know them to be, mere frauds. Some of our Chancellors of the Exchequer are known to have been ignorant of arithmetic. There are fine jokes—jokes understood even by board school children—told about Foreign and War Ministers of England who were quite ignorant of geography. "Bless my soul, you don't say so—Actually Cape Breton is an island—actually. I must go to the King at once and tell him that our great expedition has been sent to an island!"

These are no longer jokes to me; I merely feel that it is extraordinary that a man can have been so educated as to be a good debater, to be able to make a fine speech, that he may have taken a degree at Oxford, that he may have passed examinations in classics, philosophy and mathematics, and yet be exceedingly ignorant, illogical, unscientific, and unable to do easy computation. Some of us say that it is only through the experimental study of natural science, and not at all through the classics, that the brain of the average Englishman can be educated on that side which is never educated at the present time. We say that he is never taught English, yet history and English literature are finer mediums for his education than ancient classics. We say that if when young he was taught to be fond of reading English—and every child may be made fond of reading—later on he would be able, and very willing, to use books, and that a man who is fond of reading and is able to use books keeps educating himself all his life long. But books alone at Oxford are not enough. They are not wise the men who think that lectures and books alone, and observing lecture-table experiments, can give men an acquaintance with the great discoveries in natural knowledge which are revolutionising the world.

Do you know the ballad about the Count Arnaldos who envied the old helmsman his weird and wondrous powers?

> "Would'st thou, thus the helmsman answered,
> Learn the secret of the sea,
> Only th se that brave its dangers
> Comprehend its mystery."

I know there are many men in Oxford who think, like the wistful Count, that they can get all things easily or from mere reading. But, in truth, to read "The Origin of Species," or treatises on geology or astronomy or physics or chemistry is a misleading performance unless the reader brings to the study that kind of mind which has been developed already by his own observation and his own experiment. My classical friends laugh at me when I say that I know much Greek literature through translations, and yet they pretend to be able to weigh scientific arguments without having made any practical study of science. At all events I know my defects. I know that although a translation may give me in every particular the meaning of a Greek author, it cannot give me the music of the old language; the reasoning and facts are mine, but not the emotion. And when my classical friends say that they can weigh scientific arguments I laugh, for there are parts of those arguments as much beyond their comprehension as scientific evidence is beyond the comprehension of a Chancery Court. Who can compete with a barrister in reading, in extracting the meaning of a written document? and yet barristers fail utterly in getting scientific knowledge from books.

Besides the aristocratic undergraduates you have a larger number of middle class men at Oxford who will succeed their fathers in the management, not merely of landed estates, but of much more valuable estates in the distribution and manufacture of things. The education of these men from infancy has been on the same lines as that of their superiors, but it has been much more artificial, and remains much less thorough to the end of the Oxford course. There is, however, the same contempt for books, for learning, and the same absence, not merely of knowledge of natural science, but of those scientific habits of thought and methods of approaching problems which experimental research tends to produce. They are proud of being Oxford men, and are even more strongly imbued than the others with Oxford utilitarian prejudices. They have studied mathematics—mathematics is useless in business. Natural science was said to be taught at Oxford, and no man seemed one bit the better for having studied it—natural science is useless in business. These men become the owners of factories the spirit of which ought to be scientific research; the competing factories in Germany, France and America are run by men of scientific method, and our men discourage reform in every possible way. The rule of thumb of their fathers and grandfathers is good enough for them. Their factories are so badly arranged that the works cost of any manufacture is twice what it ought to be, and the time taken is twice as great. They take eagerly to all sorts of quack remedies for bad trade; they are easy victims to fraudulent persons. These are the men who discourage all education in the people employed by them, managers, foremen, and workmen. They are what I call unskilled workmen, that is, unskilled owners of works, and it is Oxford which is to blame for their unskilfulness. It is astounding how quickly the thriving businesses of the fathers are decaying, how quickly unskilled owners of works are being eliminated.

but there is a new crop of them every year. The want of education of these men is very harmful to the country, and Huxley, Lockyer, Armstrong, Ayrton, Magnus, and other educational experts have written at great length upon the subject over and over again. If I thought that the expression *technical education* were understood at Oxford, I might, perhaps, try to ventilate this part of my subject, but it is quite misunderstood, and as these writers have failed to make any impression I think it better to let it alone.

Fifty years ago the Prince Consort started many good things agoing, and probably the most important was the Science and Art Department, the science classes of which under Sir John Donnelly forty years ago, greatly developed by Sir William Abney since, have given a better education in natural science to hundreds of thousands of poor boys than Oxford gives even now. I feel sure that it is this that has saved our industries from the jealous, hungry, persistent scientific foreigner. Wherever there is an owner of works whose common sense triumphs over his defective education, he gives a free hand to a manager who has been taught in these classes or in one of the technical colleges now springing up. These technical colleges are the natural outcome of Sir John Donnelly's work. I am glad to think that their methods are far removed from the soul-destroying methods of Germany; they are gradually becoming more and more perfect as British institutions. They illustrate the British experimental method of tackling an important problem. The one bar to their success is that the boys from all the schools of this country, primary and secondary, but particularly from those schools which are more immediately under Oxford influence, are quite unfitted by their school training to benefit by technical college teaching. The time of the professors and instructors is greatly wasted in correcting evils that are due to the schools. I think on the whole, however, that middle class England is slowly waking up to the importance of education. Every kind of education she has seen in the past has seemed to her not worth striving for, and her sleep has been very sound and very prolonged. But a kind of education is now being exhibited to her which seems as if it might give a fine sort of mental training, and as soon as middle class England sees this matter clearly as a thing worth having, the rule of old Oxford over many of our schools will cease. For Oxford has not merely induced neglect of science; she has been its active enemy pretending friendship. What schoolmaster from Oxford is there who does not see his existence threatened by science? Consequently, middle class England has been paying large premiums with its sons and yet seeing them fail to obtain employment, whereas board school boys are successful enough in reaching lucrative positions, although they have paid no premiums, and have been earning wages all their lives.

It is not the schoolmasters, it is the engineers who have been educating England. The engineer is always thinking of utility, of the value of time, of the fact that a man has only one life in which to do what good it is possible for him to do. So he reads novels and poetry and history; he enjoys painting and music; he travels and sees other people, other nations and their monuments. He cultivates and exercises the whole of his mental and emotional machinery so that he may become more perfect as a student of what Goethe called "the living mantle of God."

Everybody speaks of how the engineer has created what is called modern civilisation, has given luxuries of all kinds to the poorest people, has provided engines to do all the slave labour of the world, has given leisure and freedom from drudgery, and chances of refinement and high thought and high emotion to thousands instead of units. But few seem to see that the engineer is educating the imagination and poetic faculty of England. Every unit of the population is becoming familiar with scientific ideas, for he can hardly take a step without becoming acquainted with romantic steam engines and electromotors, with telegraphs and telephones and steamships, with drainage and waterworks, with railways, electric tramways and motor-cars. Every shop window is filled with the products of engineering enterprise. It is getting to be rather difficult for people to have any belief in evil spirits and witchcraft, and this is probably the most enormous intellectual stride that the great body of the human race has ever made in any half-century. It has been made in spite of the persistent opposition of Oxford.

It is due to Oxford that the interest taken in natural science by the richer classes, by men of expensive education, does not seem to be much greater now than it was thirty years ago. Some of them are called scientific if they go to hear lectures illustrated with fireworks, or if they assume as their eyes glance over a quasi-scientific article in a magazine that they are taking an interest in science. But among the less rich classes, the people who work with their brains, there is an interest now in science which is increasing in amount by the compound interest law. This new interest is recognised in the fine idea of Sir Norman Lockyer, so well talked about this summer, to form a great British Guild of Science the members of which might include almost every adult man or woman of brains in our Empire. His object is to organise the efforts now being made everywhere to interest people in science, to develop education in scientific method in every school in the country. I feel sure that this Guild will some time be formed successfully, and that it will do enormous service to the world. Its being successful in our own time depends mainly, I think, on the energy and persistence of Sir Norman Lockyer himself, and he certainly is an energetic man. May I ask if Oxford means, in her place of fancied security, merely to look on at great scientific movements? Or may it even be that she will use her autocratic authority to put all these movements down? Will she, in her pride, champion another lost cause? Or has she a sufficient number of young able men rich in the sort of enthusiasm possessed by William of Waynflete or William of Wykeham, by the pupils of Grocyn who did not lecture to Erasmus, or of Colet, the Dean of Eastminster. Just think of it you Oxford men, you who have entered on such an enormous heritage, you who have been supposed to stand for centuries at the head of the intellect of England. Are you now going to stand aside or are you going to oppose the greatest intellectual movement that has ever taken place in this world—or are you going to take your natural places in the foremost files of time?

If Oxford taught science through a student's own research, if Oxford gave a broad general culture suitable for all sorts of men of all sorts of minds, there is hardly any middle class man in England who would not be glad to send his son to Oxford. Even now the prestige of Oxford and the social advantages that it offers overweigh in the mind of many a parent all the intellectual disadvantages.

A man must be very impudent or very bold, or he must have much of the martyr in him, to criticise corporations like those which exist in Oxford. He must feel his cause to be infinitely right, because Oxford men have always been famous for their command of rhetorical weapons. There is hardly a man worthy the name of scholar in Oxford who has not a better command of such weapons than I. Think of the time when Oxford had fallen from her high estate in scholarship, so that Boyle and Atterbury had the same sort of ignorance of Greek which Oxford men now have of natural science; yet were these impostors so clever that they set all the world laughing at Bentley, the greatest scholar of a hundred years. Am I to be the fresh victim of the Bull of Phalaris?

Call it impudence if you please, but Oxford ought to be told what some outsiders think in this matter. She that represents all that is best in England, does indeed in some respects represent what is worst. Every young Oxford man is like a knight who sees only how beautiful is the lady whose colour he wears, and he forgets that the lovely body does not always cover the soul of Una; sometimes it hides the evil witch Duessa.

I do not address average men. I speak to those clever young men whose names are known now only in Oxford, whose names will in the future be carried on trumpet blasts over the world and for long time to come. Surely you aim at the study of those great eternal truths about man and nature which are hidden from the common view by prejudices; and surely you know that Oxford prejudices, however consoling they may be to your self-respect, however secure they keep you now from adverse criticism, are after all mere formulas and of only limited application, both in time and place.

You will say that I also have my prejudices, which urge me to ask if you wish for ever to look at man and nature through Greek spectacles. Well, I certainly cannot worship at Greek shrines. If Jowett's translation is the real Plato I can see none of the infinite depth of thought that my friends rave about; he seems to me pretentious and shallow; and when Aristotle speaks about things of which I happen to have some special knowledge, he seems to me so unscientific as to be maudlin. Macaulay somewhere says that the account by Thucydides of the retreat of the Athenians from Syracuse is the most affecting episode in history. Well, I have a great respect for Macaulay, and I have tried to cultivate a love for the people of the city of the Violet Crown, but I know some crimson patches of Macaulay's own which seem to me to be to Thucydides what Swinburne is to Shenstone. What is a fair man to say when he hears his friends talk of the greatness of Sophocles and Euripides and Aristophanes in the original, if he knows that these friends never read Shakespeare or Jane Austen or Goldsmith or Dickens? I feel ungrateful as I speak, for I have enjoyed the reading of Bohn's "Odyssey" and many another translation from the ancients as much as anything modern. Yet I cannot help acknowledging a suspicion that this worship of Greek is like one's fondness for the rhymes, often rubbishy rhymes, that associate themselves with our infancy and boyhood, or like Johnson's belief that his wife was amiable and beautiful. Have I, therefore, prejudices against Greek which prevent my seeing things from an Oxford point of view? I think not. At all events I can respect it, for I know that the other point of view has been held by some of the greatest Englishmen, and this alone is sufficient to give me diffidence. But whatever diffidence a man may feel in the expression of his opinion, he is sometimes compelled to put it aside. Not once, but many times in preparing this address upon Iceland and its snakes have I felt how stupid I was to undertake it, but it was too late to withdraw.

You will say that I, a man of little culture, am very poorly qualified to speak of reform to cultured Oxford men. Do you think that Jonah was particularly cultured when he was called upon to urge reform upon the rich, the intellectual, the high descended people of Nineveh? I do not speak to conscious Oxford. It is something altogether subconscious in a human being or in an institution to which we really speak when we expect reform. It is to subconscious Oxford that I speak, that dumb unconscious soul which has, on the whole, guided her rightly through the centuries in spite of all the visible long-continued eruptions of the flesh. Many colleges have for generations in the past been given up to eating and drinking and sensuality in general. Jealous quarrelling has ruled in her common rooms. Poor thin scholarship has often had unworthy victory. But the heart of England is beating in Oxford, and on the whole it is a very sound heart.

Now it seems to me—a rank outsider—that Oxford is cursed among universities in one very important particular. There has in the past been only one kind of real study here. Whatever was studied in Athens or Alexandria to the end of the second century A.D., that has been open to you, that has been a medium of mental training. But those subjects in which Germany has made her mark, theology, law, history, Bible criticism and others, these are denied you.

Who was it who first pointed out how England differs from France in one important particular? The French Revolution has made such a complete severance of the modern from the old French system that a French philosopher can discuss French history as if it were of another planet. When he speaks of the old provincial Parliaments or the edicts of St. Louis, his prejudices and interests interfere in no way with his reasoning. When he discusses the present Concordat or the *Coup d'État* of Napoleon, he makes no reference to the times of Philip Augustus or Louis XIV. But in England it is quite different. When the lunacy regency in the time of George III. was being discussed in Parliament, all the precedents long before the time of Henry VI., even back to the time of Edward II., had the force of legal documents. The Parliament and ministers of Charles I. both appealed to English history, and both found support for their very divergent views, and so English history has to be read and written with the bias of modern political party spirit. In the same way the student cannot touch the questions of theology or law without considering them as party questions. A subject which can only be approached by a student with prejudices evoked by the party politics of his own day is distinctly not a subject through which university culture is possible; I mean that it cannot be studied scientifically. Theology presently becomes mere dogma, and degenerates into credulity as the glory of the church is more important than truth. Thus it is that the scientific students at Oxford have confined themselves to the study of eight or nine old books. Never, perhaps, has there been so wonderful a phenomenon as this, the cleverest men of a nation devoting themselves for centuries to one narrow stream of erudition, making Greek literature and Greek philosophy phosphoresce in the most brilliant manner. But it is too narrow, this stream, and the laws of the game are too technical, too artificial. Consequently, every now and again something like the fidgets, the desire for something real to think about, seizes upon the Oxford community; it throws itself into politics or tractarian movements, it is strongly conservative or strongly liberal, it is high or broad or low, and, after a splendid display of energy, the fever works itself out, and there is a gradual return to the older learning after a time of unintellectual laziness. In these times of fever, as in the time of the Tracts, real study falls to its lowest ebb, because truth of any kind has ceased to be an object of worship. If I am right, then it is the leanness of the studies which are really scientific which causes these great alternations, these periods of degradation, these times of easy conscience when that freedom which is the glory of Oxford degenerates into licence. You know quite well that there must be such degeneration unless men have healthy, delightful work to do, and there is a healthy public opinion to be feared or welcomed.

Such attacks as those on the fair-minded Gibbon and examples such as that of the very much prejudiced Froude show how difficult it is for any Englishman to make a scientific study of English history, or English law, or English, or, indeed, any kind of Christian theology. Indeed, in the study of mental and moral philosophy of the *a priori* kind, according to any school from that of Socrates to that of Kant, it is difficult for an Englishman to keep clear of dogmatic theology and partisanship.

But the great world of natural science remains, the region in which no attention whatsoever need be paid to sacred books, to dogma, to authority, the region in which the mind feels no fetters, where no kind of individuality is a crime, a world of promise in which the first pioneers have already in a short time found great stores of wealth on the mere surface of the ground, a world which seems infinite in its possibilities. It is only in this free atmosphere that the mental constitution will become healthy enough to be able to combat prejudice and the dogmatic microbe. Talk no more of man as if he were apart from nature. The mind, the consciousness, the soul of man and all his emotions are natural and to be studied by the deductive and experimental and inductive methods used by us in all parts of natural philosophy. Give up this mere absorption of other men's ideas, whether in old classics or in quarterly and monthly reviews, this collecting of ready-made opinions on all subjects whatsoever. Are you for ever to hang to the apron strings of the ancients? Is your manhood worth so little that you cannot exist without worshipping men who were creatures like yourselves? You speak of the reason of man as if it were an omnipotent thing. We speak of the spirit of God in man brooding over phenomena which seem chaotic until new light is evolved and you actually think that we are beggars living upon scraps of wisdom dropped from your tables. When you insist upon your classical tests you spoil our whole scheme of study, and you are merely acting as brigands, you are only taking that sort of *advantage* which all mean people take when they have official positions.

It is not learning that is important. A university is to create men, men of original thought, men of character, men of resource, men fond of reading. And you men of the university as distinct from the colleges—if you really can invent some examination which will select the men of thought, do so, and use it, but for my part I do not think this business of selection one for

any kind of machinery that ever yet was invented. There is too much of the ludicrousness of Teufelsdröch's iron king about all schemes of examination that ever I have known, and there is too much of the draper's assistant style of work about your boards and committees. If you have any really important piece of work to do, give it to some one *man* to do, and ask people to discuss it at a public meeting; but this committee kind of pretence of work is getting to be ridiculous. You are certainly wasting the time of the few good men and giving easy consciences to all the other men who attend these boards.

I hold a brief for the average man usually said to be stupid, and yet I have been speaking of scholars, the rulers of the university, the men to whom younger men look up with worship. This is because there can be no real teaching unless some of these higher men are really great students themselves. Never did men have as good a chance of education for themselves as the fellows of the rich Oxford colleges; never had men such a chance of merely marking time and pretending to educate themselves.

About seventy years ago teaching began to become the very valuable monopoly of the college tutors. This could hurt, but could not destroy, the effect of college life in producing liberal culture. The college don ceased to be a student, he tried to teach many different subjects much in the style of the fourth form master in schools; he prepared men for Responsions, which is really a sort of belated matriculation examination; clever men may still pay him fees, but for them there is only harm in attending his classes. Hence it is that for thirty years you have been returning to the ancient practice, and the number of university professors, of lecture halls and laboratories is slowly growing. Surely this is the direction of true reform. Is it not possible to get each rich college to establish two or three great schools in which only two or three subjects may be studied by men through their own research, commanded by men of the highest talent and initiative, who are free to teach as they please and to examine as they please? But what chance is there of this or any reform? We have reached a time when the good men are discouraged and the bad men are triumphant. The powers of Arimanes set themselves against the powers of Oromasdes, disputing reform, and there have been many signs during the last fifteen years that the powers of darkness, those opposed to science, have organised themselves more scientifically than the powers of light. They have determined that in the future no change shall be made in the character of Oxford studies.[1] They do their best to make past reforms operative only for evil. As for the reformers, their conception of a university is of one in which there are so many literary and scientific subjects taught that every student can obtain, through the study of few or many of them, the most perfect training of which his mind is capable. Some of us have the belief that the average mind is capable, by training, of becoming immeasurably richer than even a few exceptionally great minds have ever been.

By the study of a subject I mean not merely listening to lectures, not merely using books, not merely a student's own research, or discussion with other men whose courses of study may be the same or not the same, but all this and much more, the most important after research being the worshipful study of great men whom the student is privileged to meet and possibly to work with. I mean also that a youth ought to have had a previous training fitting him for university study. There are few boys who might not be well trained at the age of fifteen; in my opinion ninety per cent. of Oxford undergraduates are at present quite unfit for any kind of university study.

I now come to a question in which I stand alone, and I beg your patience. My best friends seem unable to criticise me, for they find it impossible to get to my point of view. What ought to be the nature of the matriculation examination? I wish I had half an hour in which to try to convince you that its sole object is to test whether a student is likely to benefit by *any* of the university courses of study. Surely this was the mediæval idea; the one compulsory subject was Latin, because all the literature known to students and teachers was in Latin; all lectures were delivered in Latin; all teaching was in Latin. Consequently, in some Oxford colleges a man was fined if he spoke in any other tongue. Surely it was a good time when all learned men in the world spoke the same language. Then came the time when there was still no English literature, and not only was the best literature in Greek, but Greek was the only approach to natural knowledge, so Greek also was compulsory, and so it has remained to this day—to this day, when English literature is of greater worth than any ancient or, indeed, any other modern literature, when all teaching, all lectures are given in English, and when our English knowledge of natural science is not only infinitely greater than anything possessed by the ancients, but it enables us to say that the ancients were hopelessly wrong, when nobody except the official university orator or some traveller ignorant of the language of a foreign country speaks Latin, and speaks rather the Latin of Stratford-atte-Bow than the Latin of Rome! Three hundred years ago the rule was reasonable and necessary, but to insist on its observance now, when it is stupid and unnecessary, seems to me quite unscientific.[1]

I would therefore make a knowledge of Latin or of Greek compulsory only on students of certain subjects, and the professor ought to impose the condition, not the university. Again, students of certain other subjects ought to be supposed to know one or more modern foreign languages, and, indeed, it seems to me that the professor in each subject has a right to insist, if he pleases, on his students having certain special knowledge before they enter on the study with him. I would give him this right because I want him to have perfect freedom. But to enter the university, merely to matriculate, surely the compulsory subjects ought to be as few as possible. It seems to me that the most important thing is that every student should have had an early education through his own language, English; should be able to write an account in English of anything he had seen; should have some acquaintance with what are called English subjects, such as geography and history and the principles of natural science, and the power to make simple computations. All the teaching is to be in English, all his companions speak English; there are good English books on all subjects, there are English translations of all the good books that have been written in foreign languages.

I am afraid that no Oxford man can understand the following statement, which I make as a man of some experience, speaking with a full sense of responsibility. So abominable do I think *compulsory* Latin or Greek, or French or German, that I believe a board school to be a much better school than any other for a boy if he is fitting himself for any profession in which applied science is important.

I can understand why Tom Sawyer and his friends, when they started their gang of robbers, initiated them through passwords and a ritual. That was for "side." The gang did not consist of pirates or robbers; they were innocent young boys, and their passwords and ritual were the essence of the romance of the thing. This compulsory Latin and Greek for the average youth at Oxford seems to me merely grown up Tom Sawyerism, and it is allied in obvious ways to the worship of mumbo-jumbo. It used to be that the use of fur on clothes was reserved for the higher classes. At another time gentlemen only were allowed to wear swords. In China and Japan certain buttons and coloured dresses indicated certain rank. In our own time there are fashions of slang which distinguish the smart set of society. The survival of Latin and Greek as compulsory subjects is very much the same sort of thing. It

[1] Throughout this address my hands have been tied so that I may not make particular references. But suppose I were to provide money for the endowment of a valuable professorship of some scientific subject, do we not know what the Oxford authorities would do with it? They would appoint as professor a man who had never done any scientific work, who can never be expected to do any scientific work, who never wants to do any scientific work; and whose highest ambition will be to act zealously as the bursar of his college!

[1] It is very interesting to me to note that on the very day when I wrote this sentence, after dinner, amusing myself and not in any way for the purposes of this address, I happened to be reading the "Life of Plutarch" written by the Langhornes, and these words caught my eye:—"Another principal advantage, which the ancient mode of the Greek education gave its pupils, was their early access to every branch of philosophical learning. They did not, like us, employ their youth in the acquisition of words; they were engaged in pursuits of a higher nature; in acquiring the knowledge of *things*. They did not, like us, spend seven or ten years of scholastic labour in making a general acquaintance with two dead languages. These years were employed in the study of *nature*, and in gaining the elements of philosophical knowledge from her original economy and laws."

has no more to do with education than the two hind buttons on our coats or the wigs of our judges have to do with convenience. These three kinds of school training—in one's own language and literature, in the principles of natural science, in common-sense computation—are absent from all public schools at the present time; it seems mere impudence in me to make them the only compulsory forms of training for men who are to enter a university. Until this is done, I think that most of the endowment of science scholarships is quite wasted.

I agreed to give this address because I knew that Sir Norman Lockyer intended in his British Association address to propose a very large Government endowment of the universities. At first sight his suggestion that 24 millions of pounds should be devoted to this purpose seemed ridiculous, but careful study has brought many thoughtful business men round to the idea; it is not utopian, it has actually a good chance of being carried out.

I saw, as many of my friends see, that the one thing which may wreck the project is the reputation of Oxford. Our rulers who have to grant the money know of universities only through their knowledge of Oxford. It is hardly possible for them to understand what we mean by a true university, which would give to every student real breadth of culture, real mental training. They may be brought to see it if Oxford men are in earnest in trying to develop Oxford on scientific as opposed to unscientific and ill-regulated lines; if the powers of light organise themselves as scientifically as the powers of darkness are organised. But there are certain intellectual movements going on in our nation which may force our rulers to grant the money; Oxford seems to know little about them and to care less; they seem to her to be merely a new untying of the bags of Æolus; it is my belief that if Oxford knew more about them she would build an altar to the goddess of *Fear* and offer sacrifices upon it, yea, burnt offerings of some of her best-loved possessions.

Oxford has a well earned prestige and still attracts all young men of intellect, but these new intellectual forces may quite quickly destroy the reputation which has been built up during centuries. For example, we have a new kind of secondary school, of which some five hundred have been established all over the country in the last few years. I myself think the science schools, scheduled as A schools, to be much the best of them, but the most numerous of them are the B schools, in which there is some natural science taught through boys' own research, but the time devoted to it is not much more than what is sufficient to enable us to say that in these schools boys are greatly emancipated from the old Oxford limitations. These schools before their emancipation sent many a fine scholar and mathematician to Oxford and Cambridge. They still rank below the great public schools. What is aimed at is an education which may suit any kind of boy, a real liberal education such as the older schools know nothing of. It is even hoped that shortly somebody in one of these schools will discover how English may be taught to English boys. All these, like the science schools, are due to the work of Sir William Abney. Now the boys of these schools, when they leave, wish to complete their education on the lines on which they have been working so far; are these exceptionally able students to be told that Oxford cannot complete that education? Few people seem to be aware that the growth of these schools indicates a great revolution; anybody who notes their rapid growth must feel sure that in a few years no secondary schools, except a few of the public schools, will continue to work under Oxford traditions. It ought to be noticed that unless boys in future are prepared on these new lines, it is not worth their while to enter Woolwich or Sandhurst, or the Admiralty colleges, because they will not be able to follow the higher instruction there given, and must drop out of the race for commissions. It is evident that the days of special army and other classes in schools are numbered. If Oxford by holding aloof from this movement ceases to influence the majority of the secondary schools, it will lose its influence over a great body of people of the middle class.

I have already mentioned another great movement from which Oxford is holding aloof, the movement for technical education the basis of which is the sort of study trifled with, feared, and hated at Oxford, natural science. It has spread from the very lower classes to the lower middle classes, and better and better buildings and apparatus, and better paid teachers indicate the higher and higher social position of the pupils of the technical schools. A few Oxford men have greatly helped in starting both of these great movements, and Oxford as a whole, if she cared, might be in a position to take a leading part in them. She has an influence now due to the easily interpreted fact that Oxford men occupy many of the higher posts connected with both of them.

It is not only that Oxford keeps aloof from technical education, but she keeps aloof from the very much greater thing of which this movement is only a symptom, namely, the phenomenon that trade and manufacture are no longer left to themselves as they used to be; they are being organised on scientific lines in all countries. She has always ostentatiously held herself aloof from manufactures and commerce. It is almost incomprehensible that a university aiming at breadth of culture should scorn those things which keep England in her high position, give value to the real estate on which Oxford's own revenues depend, and differentiate Oxford from Beyrout. I feel sure that this attitude ought to be quite carefully veiled if Oxford is to have such a share in the 24 millions as her prestige would otherwise warrant her demanding.

The truest stories about man are the fairy stories; they are true of all times, of all races of men, and the truest fairy story is that which tells how men who look back and not forward are turned into lumps of rock or pillars of salt.

I want the forces of light at Oxford to organise themselves to teach Oxford how she may become worthy to maintain the reputation which she earned so well in the past. Her great glory is *not* in her defence of lost causes as many men think. Was the movement started by Roger Bacon a bad cause? Is it a lost cause? Has the movement started by Grocyn and Colet become a lost cause? Has the movement started by those Oxford men who founded the Royal Society become a lost cause? Are the names of Wycliffe and Wesley forgotten? Have the reforms started by Stanley, Jowett and Pattison in our own times become lost causes? Not yet! The influence of Oxford over intellectual England used to be supreme, it is still enormous; it rests with the young Oxford men of the present day who know something of history to decide whether this influence may or may not become a cause lost beyond all chance of finding again.

A NEW GERMAN BOTANICAL SOCIETY.[1]

THE publication of the first report of the meeting in Berlin of the Society of Germans interested in the Study of Systematic Botany and Plant Geography calls for more than passing notice. The society owes its creation to a well-founded cause, and is indicative of a response to that spirit of colonisation which has shown itself in Germany more and more during the past thirty years. In the first half of the nineteenth century the British Government, merchants and others were calling out for information as to the character of the flora of our colonies, and, as a result, British botanists were mainly engaged in the study of systematic botany, while the German botanists were occupied in the investigation of the structure, physiology and pathology of the individual plant, with results in each case well known to all serious students of botany.

The German systematists do not take a prominent place at the meetings of the German Association for the Advancement of Science, and though in their new society they propose cooperation, if possible, with it and with the Deutsche Botanische Gesellschaft, they seem to feel the necessity of a separate society to meet the requirements of their own branch of botanical study, which, during the last twenty years, has made enormous strides. Explorers have been sent out into all parts of the globe, and not simply to the German colonies. Listening to the papers from day to day it seemed that, so far as the conference was concerned, the

[1] Bericht ü. d. Erste Zusammenkunft der freien Vereinigung der systematischen Botaniker u. Pflanzengeographen zu Berlin. Pp. 83. (Leipzig: W. Engelmann, 1903.)